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NEW SPECIES OF TRICHOPTERA FROM THE APPALACHIAN REGION.

By HERBERT H. ROSS,

Illinois State Natural History Survey, Urbana, Illinois.

Among the aquatic insects collected in various parts of the Appalachian system by Dr. T. H. Frison, his son, Theodore Jr., Dr. B. D. Burks, Mrs. Ross, and myself, there have appeared several new species of caddis flies. Those of especial interest or those which were reared are described in this paper. Types designated are in the collection of the Illinois Natural History Survey. I am greatly indebted to Dr. C. O. Mohr of the Survey staff for much assistance with the drawings.

Rhyacophila Iedra, new species.

Male.—Length 11 mm. Body brown, without conspicuous dark areas but with irregular patches of darker brown along most of the sutures. Forewings gray with white fenestrated markings, the largest marks grouped along hind margin; hind wings uniform bluish-gray. General structure typical for genus. Genitalia, fig 1, closely resembling those of *fenestra* Ross, differing in the short apical segment of the claspers and the shape of the lateral aedeagal arms. Tenth tergite pointed and beak-like, incised apically down the meson to form a pair of pointed lobes. Claspers relatively short; basal segment broad, its ventral margin strongly angled; apical segment short, without a baso-mesal lobe, its apical margin deeply incised to form a short, dorsal "thumb" and a long, tapering ventral portion. Inner face of apical segment with a brush-like mass of short, brown setae covering almost the entire area. Aedeagus, fig. 1A, composed of a pair of lateral arms and a mesal process formed of a dorso-mesal beak and a pair of flared ventral plates. Lateral arms set in a membranous, extensile pocket; their basal stock is long and narrowed, the apex enlarged, rounded and club-shaped, and in the middle of the apex is a pocket of long, brown spicules of fairly even length. Central part of aedeagus with the mesal beak double and the lateral extensions wide and regular, the apical margin of each half evenly concave.

Female.—Similar in size, color, and general structure to male. Apical segments of abdomen tapering rapidly and forming a regular, tube-like apex. Characters have not yet been found to distinguish it from the female of *fenestra*.

Holotype, male.—Jasper, Tenn., April 25, 1938, Ross & Burks. *Allotype, female.*—Same data. *Paratype.*—Martin Springs, Tenn., April 25, 1938, Ross & Burks, 1 ♂.

Rhyacophila carolina Banks.

Male.—Length 11 mm. Similar to preceding in color, general structure and general plan of genitalia, differing in details of genitalia as follows, fig. 3: lateral lobes of tenth tergite short, ending in a short, sharp point; apical segment of clasper arcuately incised, dorsal lobe rounded, ventral lobe long and somewhat finger-like, the inner face of the segment with two long patches of short, black setae, one along the dorsal lobe which makes a short curl at base, the other along the entire ventral margin; lateral arms of aedeagus entirely membranous with a paw-like apical brush of long setae grouped into six brushes; median carinate process of aedeagus with top wide, concave and narrowed at apex into a beak, the horizontal process below this tubular.

This species resembles the above most closely in general appearance but is very distinct on the basis of the flat crest of the aedeagus.

Agapetus crasmus, new species.

Male.—Length 5 mm. Body dark brown, the entire insect appearing blackish in life. Legs with basal half dark brown, apical half lighter, clothed with straw-colored setae. Wings dark brown with slightly lighter setae. Spurs, antennae, ocelli, and wings typical of the genus. Genitalia most closely resembling those of *artesus* Ross, differing as follows, fig. 2: Claspers short; lateral face with a sharp, apico-dorsal corner and a straight, oblique apical margin; ventral face showing a wide base abruptly excavated on the meson to form a very slender, latero-apical area, with two heavily sclerotized points showing in silhouette. Tenth tergite divided almost to base, each half with the ventral portion heavily sclerotized and upturned into a hook-like apex; dorsal portion membranous.

Female.—Similar in size, color, and general structure to male, apparently inseparable from related species.

Holotype, male.—Martin Springs, Tenn., April 25, 1938, Ross & Burks. *Allotype, female.*—Same data. *Paratypes.*—Same data, 4 ♂, 3 ♀.

DIBUSA, new genus.

Characteristics.—Wings, fig 5, typical of primitive genera of Hydroptilidae, especially the genus *Agraylea* with noteworthy characters as follows: front wing with Sc forked; Rs divided into four branches, M divided into three branches, Cu and anal veins normal. Antennae filiform, the apical segment constricted at end to form a small bump. Ocelli absent. Maxillary palpi five-segmented, first two segments short, remaining three almost subequal and filiform, the last one slightly narrower and longer than preceding. Spur count 1–3–4. Combina-

tion of characters which distinguish this genus from all other Hydroptilidae: simple venation and elliptic ovate wings, lack of ocelli, and spur on front tibiae.

Genotype.—Dibusa angata, n. sp. (original designation).

Dibusa angata, new species.

Male.—Length 5.5 mm. Color of head and body various shades of light brown, legs straw colored, wings hyaline, clothed with a mixture of gray and brown hairs. General structure as described for genus. Genitalia as in figs. 5A, B, and C. Ninth segment considerably retracted into eighth, with sides sclerotized and dorsum membranous. Tenth tergite contiguous with ninth, divided into a pair of lateral sclerotized plates separated on the meson by membranous folds, and curved downward at apex to form a short hook. What are apparently the cerci arise as a small lobe in the middle of the lateral margin at the base of the tenth tergite. Claspers biramous; ventral lobe slightly enlarged and upturned at apex; dorsal lobe more slender, outcurved, and widest at middle. Aedeagus, fig 5C, composed of a somewhat filiform basal portion markedly enlarged near base, and a semimembraneous, irregularly tapering, pointed apical portion.

Holotype, female.—Dillsboro, N. C., April 24, 1938, Ross & Burks.

Hydropsyche alhedra, new species.

Male.—Length 13 mm. Body a medium shade of brown, dorsum of head and body darker. Flagellum straw color, with a dark, dorsal V-mark on the basal eight segments. Legs straw color, the tarsi and first two pairs of tibiae shaded by dusky pubescence. Front wings mottled over their entire surface with a mixture of pale and chocolate brown areas, the two colors contrasting strongly to make an irregular pattern much more pronounced than in other members of the group. Hind wings straw color. General structure typical for genus. Genitalia, fig. 7, nearest those of *slossonae* Bks., differing in details of aedeagus. Tenth tergite with meso-dorsal portion rounded and hump-like, divided at apex into a pair of long, thin, blade-like lobes forming a horseshoe-shaped arc from above. Claspers with apical segment subconical, tapering gradually from a rounded base to a somewhat pointed apex. Aedeagus with basal portion at almost a right angle to remainder; apical bulb bearing a single, mesal pair of pockets of spicules; membranous appendages behind mesal plate provided at tip with long, stout, pointed spine and just below base of this with a small pocket containing a few short spicules. The reverse is true in *slossonae*.

Holotype, male.—Black Gap, N. C., April 24, 1938, Ross & Burks.

Hydropsyche catawba, new species.

Male.—Length 11.5 mm. Head, body and wings a uniform mottling of medium and light shades of brown; flagellum and legs straw color, the former with black, dorsal V-marks on the basal nine segments. Structure typical for genus. Genitalia, fig. 6, most closely related to *simulans*, differing in the stock-

ier ninth segment and the shorter apical segment of clasper. Ninth segment cylindrical, the dorsal two-thirds very wide, the dorsal third only indistinctly separated from the tenth. Tenth tergite small, divided into a pair of subtriangular lobes. Clasper with apical segment short, upturned, and pointed at apex, the dorsal margin evenly sinuate. Aedeagus with basal curve very obtuse, the apex slightly enlarged at origin of lateral processes; these are broad at base and taper to a sharp point; mesal plates small and thumb-like, approximate on meson; ventral cavity ovate, the lateral processes covering most of it, leaving an opening which is widest at apex and narrows markedly on the basal half.

Holotype, male.—Catawba River, Catawba, N. C., April 23, 1938, Ross & Burks. *Paratypes.*—Same data, 1 ♂.

Cheumatopsyche helma, new species.

Male.—Length 7 mm. Color entirely dark brown, the legs, sutures and venter of abdomen paler than other parts of the body; wings with inconspicuous pale areas along apex. Genitalia closest to *pettiti* (Bks.), differing in the structure of ninth and tenth segments as follows: Ninth segment cylindrical without conspicuous widening of the lateral face. Tenth tergite with apex produced into a high mesal point and a lower pair of lateral erect plates; the apex of these is somewhat rounded, clothed with long setae and bears a sharp lateral projection. Claspers with apical segment one-third length of basal segment, sinuate, and tapering to a narrow apex. Aedeagus with base bulbous and apical neck slightly constricted.

Female.—Length, size and general structure same as for male. Genitalia similar to those of other species of genus.

Holotype, male.—Gatlinburg, Tenn., June 18, 1938, T. H. Frison & T. H. Frison, Jr., at lights. *Allotype, female.*—Same data. *Paratypes.*—Same data but June 11, 2 ♂, 8 ♀; Pineville, Ky., June 24, 1938, T. H. Frison & T. H. Frison, Jr., 1 ♂.

Heteroplectron amerus, new species.

Male.—Length 11 mm. Color yellowish brown, with the eyes and dorsum slightly darker. General structure typical for genus. Head with interocular tubercles meeting on the meson. Maxillary palpi cylindrical, 5-segmented, all clothed with long setae forming a loose brush; first two segments subequal in length, next three subequal to each other and about a fourth longer than second. Legs with spur count of 2–4–4. Genitalia, fig. 8, differing from those of *frontalis* and other members of the genus in the long spines of the tenth tergite. Ninth segment deeply incised on lateral margin near dorsum, ventral portion robust and dorsal portion contiguous with tenth tergite. Tenth tergite long, the extreme apex produced into a narrow, bifid tip; below the tenth tergite arises a pair of short, stout, curved spines; just beyond this and close to apex of lateral margin of tergite is a long, sinuate, sclerotized process. Cerci large, clothed on the outer margin with long setae. Basal segment of claspers tapering to apex;

apical segment short, the right one with three long, stout spines, the left one with two. Aedeagus with a slender base surmounted by a sub-membranous bulb in which is embedded a sclerotized, U-shaped process.

Female.—Size and color similar to male. General structure and genitalia apparently identical with other species in the genus.

Holotype, male.—Parksville, Tenn., Apr. 25, 1938, Ross & Burks. *Allotype, female.*—Same data. *Paratype.*—Same data, 1 ♂.

Heteroplectron gameta, new species.

Male.—Length 13 mm. Head, body, and appendages various shades of dark and medium brown. General structure similar to above except as follows: Ocellar tubercles of head well separated on meson. Maxillary palpi with second segment annular, with a dorsal brush of long black setae; third segment three times as long, fourth segment half as long as third, both uniformly clothed with silky hair; fifth segment as long as first three combined and with a dense, appressed brush of black silky hair arising from near base and reaching apex. Genitalia, fig. 10, differing from those of *amerus* as follows: Ninth segment with a long, needle-like process extending under the cerci. Tenth tergite with the apex divided into a pair of lateral lobes, each of these with a wide, sinuate, pointed blade digressing slightly ventrad and then pointing caudad; at base of blade arises a stout sclerotized hook. Cerci relatively long, pointed at the apex. Claspers wide at base, tapering markedly to apex; apical segment short, right one with three, left with four, small sclerotized denticles. Aedeagus arcuate, shaped as in fig 10 A.

Holotype, male.—New Found Gap, N. C., June 13, 1935, along Little Pigeon River, H. H. Ross.

Lepidostoma swannanoa, new species.

Male.—Length 8 mm. Color dark brown, with the exception of the wings and legs below coxae which are tawny. Maxillary palpi club-shaped, the mesal margin flat and modified into a pocket bearing a dense cluster of white setae. Scape and wings simple, without scales. Genitalia, fig. 11, most closely related to *modesta*, differing in the shorter processes of the tenth tergite. Tenth tergite cleft almost its entire length down the meson; lateral lobes long, sinuate, with a large hump at base, a smaller one beyond it, the apex slightly upturned, lateral margin serrate. Claspers angled at base; ventral lobe with apex sinuate, narrowed and curved toward meson, with a fairly large apico-dorsal projection; dorsal process arising at base of ventral one, its base stout, narrowed, and slightly sinuate, and suddenly narrowing to a sub-ovate, flat, apical expanse.

Female.—Similar in size, color, and general structure to male, differing in the usual antigenetic characters as follows: maxillary palpi 5-segmented and cylindrical; genitalia semi-membranous, appearing as flat sclerites and apparently identical with related species.

Holotype, male.—Black Mountain, N. C., April 24, 1938, North Fork Swannanoa River, Ross & Burks. *Allotype, female.*—Same data. *Paratypes.*—Same data, 2 ♂.

Lepidostoma lydia, new species.

Male.—Length 9 mm. Color and general structure as in preceding species. Male genitalia, fig. 9, closest to the preceding but differing in the rectangular tenth tergite with its evenly immarginate apex. Tenth tergite with base wide, apical portion narrowed to a rectangular, longitudinally convex plate arcuately incised at apex, with the apico-lateral corners slightly upturned, and setae arranged as in the illustration. Claspers with base angular; ventral lobe robust, curved mesad and pointed at apex; distal process of this lobe short and finger-like; dorsal lobe with narrow basal portion, the apex enlarged, spatulate and curved mesad.

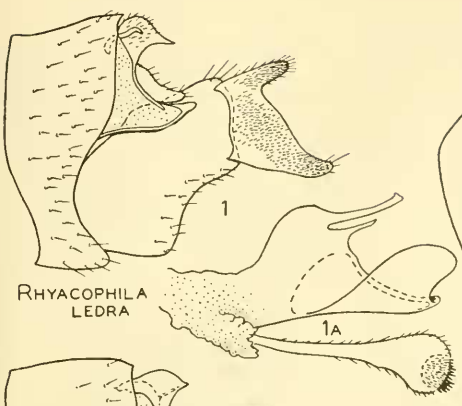
Female.—Size, color, and general structure apparently identical with *swannanoa.*

Holotype, male.—Lydia, Va., April 20, 1938, Ross & Burks. *Allotype, female.*—Same data. *Paratypes.*—Same data, 18 ♂.

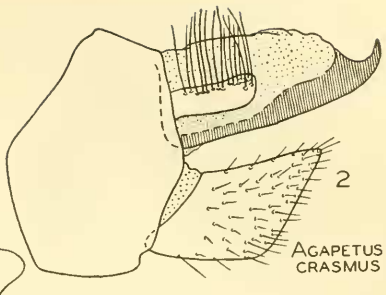
Explanation of Plates.

Male genitalia (except fig. 5).

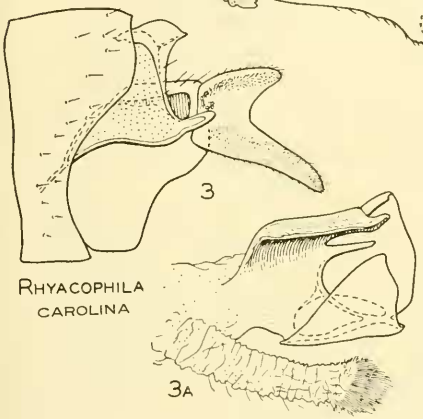
Fig. 1. *Rhyacophila ledra:* 1A, aedeagus, lateral view.
Fig. 2. *Agapetus crasmus.*
Fig. 3. *Rhyacophila carolina:* 3A, aedeagus, dorso-lateral view.
Fig. 4. *Cheumatopsyche helma:* 4A, tenth tergite, caudal view.
Fig. 5. *Dibusa angata,* wings: 5A, male genitalia, lateral view; 5B, same, dorsal view; 5C, aedeagus.
Fig. 6. *Hydropsyche catawba:* 6A, aedeagus, ventral view; 6B, aedeagus, lateral view.
Fig. 7. *Hydropsyche alhedra:* aedeagus; 7A, tenth tergite, lateral view; 7B, same, dorsal view.
Fig. 8. *Heteroplectron amerus:* 8A, aedeagus; 8B, apical segment of claspers, ventral view.
Fig. 9. *Lepidostoma lydia:* 9A, tenth tergite, dorsal view; 9B, clasper, ventral view.
Fig. 10. *Heteroplectron gameta:* 10A, aedeagus; 10B, apical segment of clasper, ventral view.
Fig. 11. *Lepidostoma swannanoa:* 11A, tenth tergite, dorsal view; 11B, clasper, ventral view.



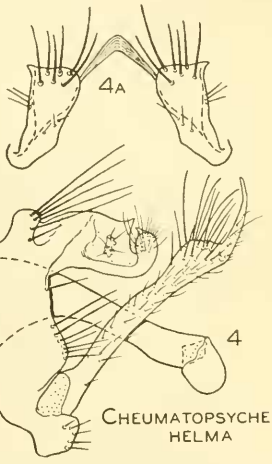
RHYACOPHILA LEDRA



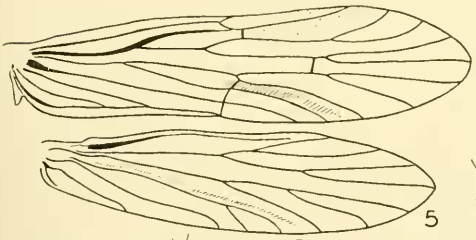
AGAPETUS CRASMUS



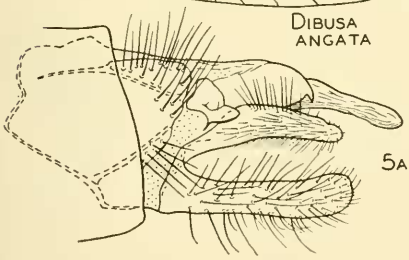
RHYACOPHILA CAROLINA

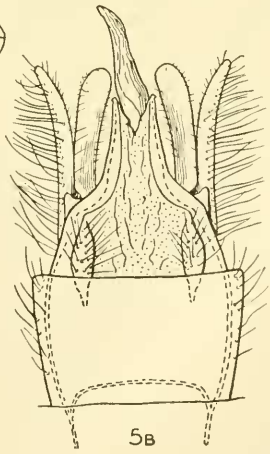


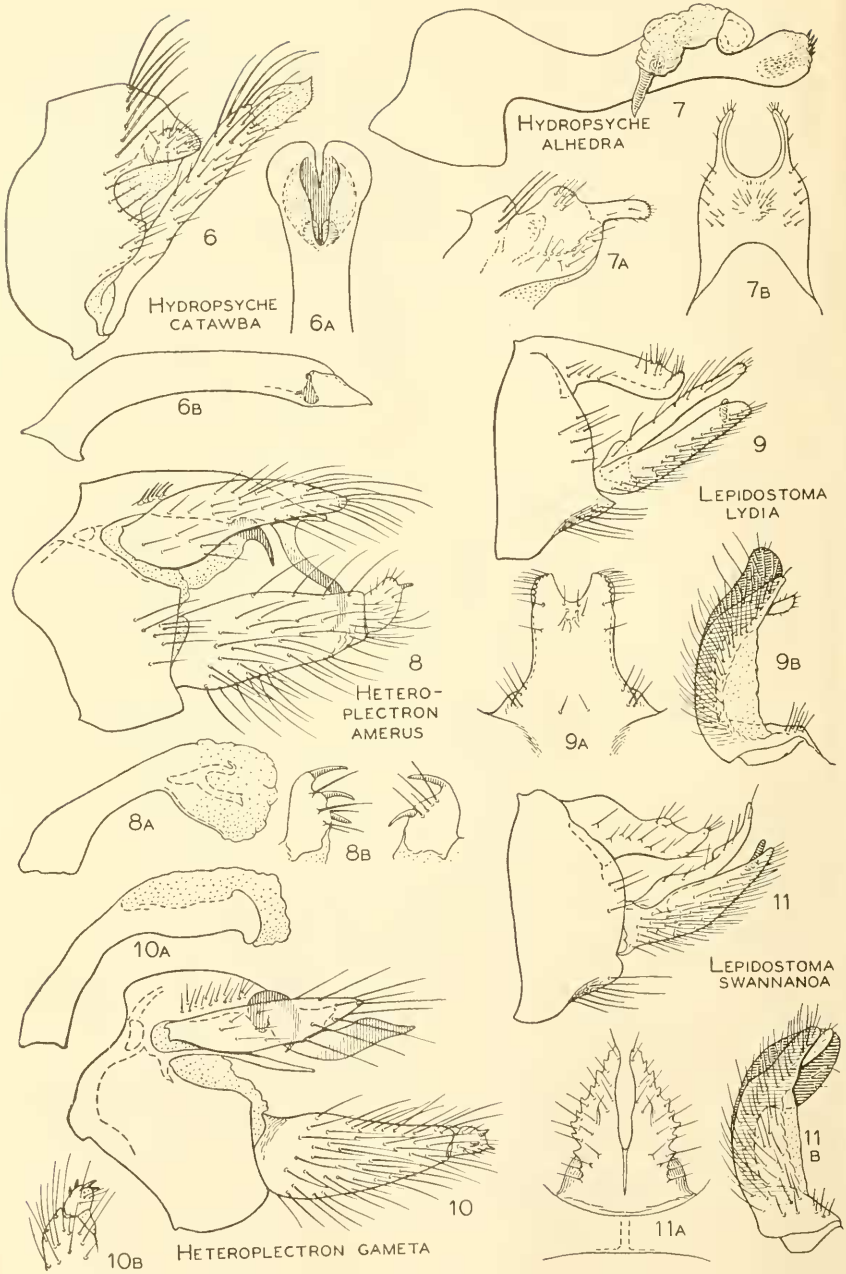
CHEUMATOPSYCHE HELMA



DIBUSA ANGATA






6
HYDROPSYCHE CATAWBA
6A
6B
HYDROPSYCHE ALHEDRA
7
7A
7B
9
LEPIDOSTOMA LYDIA
9A
9B
8
HETERO-PLECTRON AMERUS
8A
8B
10A
10
10B
HETEROPLECTRON GAMETA
11
LEPIDOSTOMA SWANNANOA
11A
11B